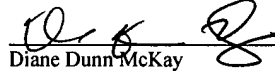




Docket No.: 4555-118 US

The undersigned certifies that this communication is being deposited with the United States Postal Service as prepaid first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on February 5, 2004.

  
Diane Dunn McKay

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

HAPPER et al.

Serial No.: 10/620,159

Group Art Unit: TBD

Filed: July 15, 2003

Examiner: TBD

Title: METHOD AND SYSTEM FOR  
OPERATING AN ATOMIC CLOCK WITH  
REDUCED SPIN-EXCHANGE BROADENING  
OF ATOMIC CLOCK RESONANCES x

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

Pursuant to 37 C.F.R. §§ 1.97 and 1.98, Applicant hereby brings to the attention of the United States Patent and Trademark Office the following documents of which Applicant has been made aware. The documents are listed on the attached PTO Form 1449. Copies of the documents are enclosed.

Applicant submits that this Information Disclosure Statement is submitted prior to a first action on the merits.

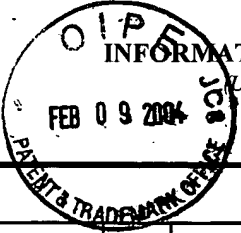
It is requested that the references be considered by the Examiner and be made of record as part of the available prior art under 37 C.F.R. § 1.104.

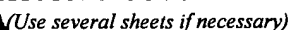
Respectfully submitted,

A handwritten signature in black ink, appearing to read "Diane Dunn McKay", is written over a horizontal line.

Diane Dunn McKay  
Reg. No. 34,586  
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Fax: 609 924 3036

|  <p><b>INFORMATION DISCLOSURE CITATION</b><br/>(Use several sheets if necessary)</p>   |     |   |            | Docket Number (Optional)<br><b>4555-118US</b> |       | Application Number<br><b>10/620,159</b> |                               |    |
|---|-----|---|------------|---|-------|---|-------------------------------|----|
|   |     |   |            | Applicant(s)<br><b>HAPPER et al.</b>          |       |   |                               |    |
|   |     |   |            | Filing Date<br><b>July 15, 2003</b>           |       | Group Art Unit<br><b>TBD</b>            |                               |    |
| <b>U.S. PATENT DOCUMENTS</b>  |     |   |            |   |       |   |                               |    |
| *EXAMINER<br>INITIAL  | REF | DOCUMENT NUMBER   | DATE       | NAME  | CLASS | SUBCLASS                                | FILING DATE<br>IF APPROPRIATE |    |
|   |     | 4,122,408   | 10/24/1978 | WALLS   | 331   | 3                                       |                               |    |
|   |     | 4,425,653   | 01/10/1984 | CUTLER  | 372   | 70                                      |                               |    |
|   |     | 4,476,445   | 10/09/1984 | RILEY, Jr.                                    | 331   | 3                                       |                               |    |
|   |     | 5,146,184   | 09/08/1992 | CUTLER  | 331   | 3                                       |                               |    |
|   |     | 4,943,955   | 07/24/1990 | RABIAN et al.                                 | 368   | 156                                     |                               |    |
|   |     | 5,379,000   | 01/03/1995 | BREWER et al.                                 | 331   | 3                                       |                               |    |
|   |     | 6,157,261   | 12/05/2000 | AUDOIN et al.                                 | 331   | 3                                       |                               |    |
|   |     | 5,606,291   | 02/25/1997 | VERBANETS                                     | 331   | 3                                       |                               |    |
|   |     | 5,642,625   | 07/01/1997 | CATES, Jr et al.                              | 62    | 55.5                                    |                               |    |
|   |     | 5,657,340   | 08/12/1997 | CAMPARO et al.                                | 372   | 69                                      |                               |    |
|   |     | 5,852,386   | 12/22/1998 | CHANTRY et al.                                | 331   | 94.1                                    |                               |    |
| <b>FOREIGN PATENT DOCUMENTS</b>   |     |   |            |   |       |   |                               |    |
|   | REF | DOCUMENT NUMBER   | DATE       | COUNTRY                                       | CLASS | SUBCLASS                                | Translation                   |    |
|   |     |   |            |   |       |   | YES                           | NO |
|   |     |   |            |   |       |   |                               |    |
|   |     |   |            |   |       |   |                               |    |
|   |     |   |            |   |       |   |                               |    |
|   |     |   |            |   |       |   |                               |    |
|   |     |   |            |   |       |   |                               |    |
| <b>OTHER DOCUMENTS</b> (Including Author, Title, Date, Pertinent Pages, Etc.)   |     |   |            |   |       |   |                               |    |
|   |     | S. Appelt, A. Ben-Amar Baranga, C.J. Erickson, M.V. Romalis, A.R. Young, and W. Happer, Theory of spin-exchange optical pumping of 3He and 129Xe, Phys. Rev. A 58, 1412-1439, Issue 2, August 1998. |            |   |       |   |                               |    |
|   |     | Hyatt M. Gibbs and Robert J. Hull, Spin-Exchange Cross Sections for Rb87-Rb87-Cs133 Collisions, Phys. Rev. 153, 132-151, Issue 1, 5 January 1967.   |            |   |       |   |                               |    |
| EXAMINER  |     |   |            | DATE CONSIDERED                               |       |   |                               |    |
| EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. |     |   |            |   |       |   |                               |    |



**TBD**

**SHEET 2 OF**

